FISH OF DEOLALI.[1]

BY

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PART III.

(*With three plates and 6 text-figures*).

ON TWO NEW SPECIES AND NOTES ON SOME OTHER FORMS.

CONTENTS.

	PAGE
Introduction and List of species	20
Systematic account	24
Chela clupeoides (Bloch)	24
Barbus khudree Sykes	24
Barbus kolus Sykes	28
Barbus ticto (Hamilton)	28
Barbus fraseri, sp. nov.	29
Crossochilus latius (Hamilton)	31
Parapsilorhynchus prateri, sp. nov.	32
Lepidocephalichthys guntea (Hamilton)	35
Nemachilus botius (Hamilton)	35
Nemachilus denisonii Day	36
Glyptothorax annandalei Hora	36
Ambassis baculis (Hamilton)	36
Concluding remarks	37
Explanation of Plates	37

INTRODUCTION AND LIST OF SPECIES.

In the first article of the series[2] a general account of the localities and lists of specimens obtained therefrom were given, and here we propose to give a complete list of the fish-fauna of Deolali, to describe the two new species of *Barbus* and *Parapsilorhynchus*, and to add notes on certain species whose existing descriptions require amplification. In preparing the following list we have adopted the classification proposed by Jordan,[3] and have given the Bhil names of the various species as supplied to us by Mr. A. G. L. Fraser. Information regarding the distribution of the different species of fishes in Deolali waters is also incuded in the list.

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[1] Published with permission of the Director, Zoological Survey of India.

[2] Hora and Misra, *Journ. Bom. Nat. Hist. Soc.*, xxxix, pp. 502-519 (1937).

[3] Jordan, *Classification of Fishes* (Stanford University, California: 1923).

Scientific Name	Bhil Name	Local Distribution[1]
Order : ISOSPONDYLI		
Family : NOTOPTERIDÆ		
1. *Notopterus notopterus* (Pallas)	Chambaree ...	6 and 38.
Order : OPISTHOMI		
Family : MASTACEMBELIDÆ		
2. *Mastacembelus armatus* (Lacép.)	...	38.
Order : APODES		
Family : ANGUILLIDÆ		
3. *Anguilla anguilla* (Ham.)...	Ahhir ...	38.
Order: EVENTOGNATHI		
Family : CYPRINIDÆ		
Sub-Family : ABRAMIDINÆ		
4. *Chela clupeoides* (Bloch) ...	Phal, Phathree, or Pathree ...	3, 4, 6, 8, 12, 16, 20, 21, 22, 23, 26, 30, 31, 41, and 49.
5. *Chela phulo* (Ham.) ...	Gayroonjee or Phal ...	6, 22, 23, 40, and 42.
Sub-Family : RASBORINAE		
6. *Barilius bendelisis* (Ham.)...	Waris, Jhor or Jhoria ...	1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 16, 19, 23, 24, 26, 27, 28, 29, 32, 33, 34, 35, 36, 37, 39, 41, 42, 43, 44, 45, 46, 47 and 50.
7. *Danio æquipinnatus* (McClelland)	Gayroonjee ...	3, 6, 9, 10, 13, 18, 23, 27, 29, 31, 33, 34, 35, 38, 39, 42 and 43.
8. *Danio fraseri* (Hora) ...	Gayroonjee ...	5 and 7.
9. *Rasbora daniconius* (Ham.).	Gayroonjee ...	7, 8, 9, 10, 11, 12, 14, 16, 18, 19, 22, 23, 29, 31, 33, 35, 36, 38, 40, 41, 42 and 44.
10. *Rasbora labiosa* Mukerji ...	Gayroonjee ...	1, 2, 4, 6, 10, 13, 15, 24, 25, 26, 34, 35, 39, 45 and 50.

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[1] The numerals given in this column refer to the locality numbers corresponding to those given in the first part of this series (*Journ. Bom. Nat. Hist. Soc.*, xxxix, pp. 502-519, 1937).

Scientific Name	Bhil Name	Local Distribution
Sub-Family : CYPRININÆ		
11. *Aspidoparia morar* (Ham.)	Sandokol, Phal, or Ambli	6, 8, 33, 41 and 42.
12. *Barbus amphibius* (C. & V.)	...	16, 18, 22, 30, 31 and 40.
13. *Barbus chola* (Ham.)	Bhokria	8 and 12.
14. *Barbus chrysopoma* (C. & V.)	Bhodeer	16.
15. *Barbus khudree* Sykes	Waris	5, 6, 8, 9, 19, 20, 21, 23, 26, 27, 28, 33, 36, 40, 41, 42, 46, 47 and 48.
16. *Barbus kolus* Sykes	Bhokria or Kholis	6, 8, 9, 12, 16, 19, 20, 21, 23, 28, 36, 38, 40, 41, 46, 47, 48 and 49.
17. *Barbus melanostigma* Day	Gayroonjee	19 and 47.
18. *Barbus parrah* (Day)	...	46.
19. *Barbus pinnauratus* Day	...	19, 22 and 31.
20. *Barbus sarana* (Ham.)	Bhodeer	20, 21, 22, 26, 30, 38, 41, 42, 47, 48 and 49.
21. *Barbus ticto* (Ham.)	Tiplee or Tiptoo.	3, 4, 5, 6, 7, 8, 9, 10, 12, 16, 19, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 39, 40, 41, 43 and 44.
22. *Barbus fraseri*, sp. nov.	...	6, 8 and 12.
23. *Cirrhina reba* (Ham.)	Arrol	38 and 40.
24. *Crossochilus latius* (Ham.).	Warootee	22, 23 and 41.
25. *Garra mullya* (Sykes)	Mallia or Kharandya	3, 9, 10, 13, 16, 19, 22, 23, 24, 25, 26, 27, 28, 29, 31, 33, 35, 36, 39, 40, 41, 42, 44, 45 and 47.
26. *Labeo boggut* (Sykes)	Sandekol	3, 6, 19, 23, 38, 40, 41 and 42.
27. *Labeo calbasu* (Ham.)	...	16.
28. *Labeo porcellus* (Heckel)	Khanoos, Kholis or Goghree	16, 17, 22, 36, 38, 46, 47, 48 and 49.
29. *Parapsilorhynchus prateri*, sp. nov.	...	1, 4, 10, 13, 14, 35 and 50.
30. *Rohtee cotio* (Ham.)	Goorda	6, 8 and 23.
31. *Rohtee alfrediana* (C. & V.).	...	22 and 31.
32. *Rohtee vigorsii* Sykes	Kaplee	46 and 49.
Family COBITIDÆ		
33. *Lepidocephalichthys guntea* (Ham.)	Mhorro, Mohroo Thail or Mohroo Chapra	6, 8, 10, 12, 13, 14, 24, 25, 29, 30, 34, 35, 39, 40 and 45.
34. *Nemachilus botius* (Ham.).	Mhorroo or Mohroo Chickna	5, 6, 8, 9, 12, 23, 26, 27, 31, 33, 36, and 40.
35. *Nemachilus denisonii* Day.	Mhorroo or Mohroo Yaree.	1, 5, 6, 10, 12, 13, 24, 34, and 39.
36. *Nemachilus evezardi* Day	Mhorro	13, 14, 23, 24, 34 and 35.

Scientific Name	Bhil Name	Local Distribution
Order: NEMATOGNATHII		
Family: SILURIDÆ		
37. *Callichrous bimaculatus* (Bloch)	Moonee	8 and 40.
38. *Wallago attu* (Bloch)	Baloo	20, 21 and 46.
Family: HETEROPNEUSTIDÆ		
39. *Heteropneustes fossilis* (Bloch)	......	12.
Family: BAGRIDÆ		
40. *Mystus cavasius* (Ham.)	Khirkirya	12, 16, 17, 22, 31, 40, 46 and 49.
Family: SISORIDÆ		
41. *Glyptothorax annandalei* Hora	Khordoo	23.
42. *Nangra viridescens* (Ham.).	Bibua	19.
Family: SCHILBEIDÆ		
43. *Proeutropicthys taakree* (Sykes)	......	6 and 8.
Order: LABYRINTHICI		
Family: OPHICEPHALIDÆ		
44. *Ophicephalus gachua* (Ham.)	Dakhia or Dhakaray	1, 5, 9, 10, 12, 23, 31, 33, 35 and 40.
45. *Ophicephalus leucopunctatus* Sykes	Murral	38.
46. *Ophicephalus marulius* Ham.	Murral	8, 12 and 40.
Order: PERCOMORPHI		
Family: AMBASSIDÆ		
47. *Ambassis baculis* (Ham.)	......	6 and 40.
48. *Ambassis nama* (Ham.).	Goorda or Bing.	4, 6, 22 and 40.
49. *Ambassis ranga* (Ham.)	Bing	4, 6, 12, 16, 20, 21, 22, 23, 26, 30, 31 and 40.
Order: GOBIOIDEA		
Family: GOBIIDÆ		
50. *Glossogobius giuris* (Ham.).	Kharbia or Kharbya	12, 16, 19, 20, 21, 22, 23, 26, 36, 40, 47 and 48.

It is seen from the above that in Mr. Fraser's collection of 4,463 specimens there are representatives of 50 species. Of these

29 belong to the family Cyprinidae, 4 to Cobitidae, 3 to Ophicephalidae, 3 to Ambassidae, 2 to Siluridae, 2 to Sisoridae and 1 each to Notopteridae, Mastacembelidae, Anguillidae, Heteropneustidae, Bagridae, Schilbeidae and Gobiidae. The abundance and variety of Cyprinoid and the comparative rarity of the Siluroid fishes are noteworthy features of the fauna. Even from the point of view of the local distribution of the species, the Cyprinoids are found practically everywhere and no doubt form the major portion of the fish diet of the local inhabitants.

SYSTEMATIC ACCOUNT.

Chela clupeoides (Bloch).

1878. *Chela clupeoides*, Day, *Fish. India*, p. 602.

In his account of *Chela clupeoides*, Day referred to the variability of the species with regard to lepidosis and number of rays in the anal fin. Though as a rule the number of rays in the anal fin is stated by him to vary from 13 to 15 $\left(\frac{2}{11\text{–}13}\right)$, in the specimens from Deccan he found them to be $\frac{2}{13\text{–}15}$. A detailed examination of Deolali examples fully bears out Day's results. In a majority of the specimens the number of rays in the anal fin is more than 15 and in some of the examples there are even 18 rays.

Barbus khudree Sykes.

1841. *Barbus khudree*, Sykes, *Trans. Zool. Soc. London*, ii, p. 357.

The precise systematic position of Sykes' *Barbus khudree* has not been properly understood so far, and the reason for this seems to be the great confusion that prevails regarding the species, races and varieties of the large-scaled Barbels of India, popularly known as 'Mahseers'. Unfortunately Sykes did not publish a figure of this species and his description contains no reference to scale counts. He characterised it as:

> 'A *Barbus*, with 4 *cirri*; blood-stained fins; large hexagonal scales; elongated body; and with 14 rays in the dorsal, 14 in the pectoral, and 7 in the anal fins.'

The above is a generalised definition and is not helpful in distinguishing the species from a large number of similar fishes found in Indian waters. Sykes' detailed description of the species given below is also very vague. He stated:

> 'Dorsal fin of from 10 to 12 rays; first long ray a thick strong bone, with 3 very short bones before it; the whole four compact: pectoral fin of 12 perfect rays, and 2 incomplete rays, ventral fins of 9 rays; anal fin of 7 rays: tail forked, of 18 rays, besides 4 short rays outside the longest rays:

scales large, hexagonal, and of a silvery bluish-green colour: mouth furnished with 4 short feelers: anal, ventral and pectoral fins tipped with blood-colour. Lateral line concave, below the centre, and corresponding to the arch of the belly: the scales along the lateral line emarginate. Length, 10 inches; height, 2¾ inches; greatest length, a foot and a half; weight, from half to three-quarters of a seer. This fish has a considerable resemblance in form, size and habits, to the *Cyprinus Mrigala* of Dr. Hamilton; but its blood-stained fins, 4 feelers, and the discrepancies in the number of its fin-rays, sufficiently distinguish it. It is sweet and agreeable food. The same fish, under varied circumstances of age, has the fins tipped with bluish instead of red.'

'Found in the Mota Mola river, 8 miles east of Poona.'

Bleeker[1] included *B. khudree* in his list of the fishes of India without any comments, but Jerdon[2], who also had no specimen of the species for examination, remarked that 'If Colonel Sykes had not given 14 rays to the dorsal fin I might have considered it the same as *B. Hamiltonii.*' Günther[3] definitely assigned it to the synonymy of *Barbus mosal* (Hamilton). Among the specimens of *B. mosal* in the collection of the British Museum, Günther mentions a 'Young: in bad state. Dekkan. From Col. Sykes' collection'. Day[4] doubtfully referred Sykes' species to his *B. neilli*, but his conclusion is not justified, for in the latter species the last undivided ray of the dorsal fin, though osseous and entire, is very weak.

In 1936, Hora and Mukerji[5] discussed the precise specific limits of Hamilton's[6] large-scaled Barbels—*Barbus tor, B. mosal* and *B. putitora*, and showed that the last two species are synonymous. In the same year, Hora[7] discussed the relationships of the large-scaled Barbels of Assam and recognised among them two species described by McClelland[8]—*B. progeneius* and *B. hexagonolepis*—besides Hamilton's two species referred to above. An examination of a large series of specimens of the large-scaled Barbel collected by Mr. Fraser has convinced us that the South Indian form is distinct from the North Indian species and, so far as it is possible to judge, seems to represent Sykes' *B. khudree.* For convenience of reference in future, we give below a detailed description of the species from fresh specimens.

D. 4/9; A. 2/7; P. 15; V. 9; C. 19; L.l. 25-27.

Like the typical *Mahseer* of Northern India—*Barbus putitora* (Hamilton)—*B. khudree* possesses a graceful, trout-like form in which the dorsal and the ventral profiles are only slightly arched and the body tapers towards both ends, but more so anteriorly. The length of the caudal fin is almost equal to the length of the head which is contained from 4.1 to 4.8 times in total length and from 3.1 to 3.8 times in the length without the caudal. Both these structures are proportionately longer in the young individuals. The depth of the body is also more or less equal to the length of the head, being contained from 3.4 to 3.9 times in the length without the caudal. The width of the head is contained from 1.5 to 1.8 times and its height from 1.3 to 1.5 times in its length. In young specimens the eye is proportionately very large and is situated almost in the middle of the length of the head. During growth, however, it becomes confined more and more to the anterior half of the head. The diameter of the eye is contained from 2.7 (in the young) to 4.7 (in the adult) times in the length of the head, from 1.0 to 1.4 times in the length of the snout and from 1.0 to 1.7 times in the interorbital distance. The eyes are not visible from below and the interorbital space is almost flat. The lips are fleshy; the lower lip is produced into a median lobe of varying extent. The barbels are, as a rule, shorter than the diameter of the eye, but in half-grown and adult specimens the maxillary barbels may sometimes be as long as the diameter of the eye.

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[1] Bleeker, P.—Nalezingen op de ichthyologische fauna van Bengalen en Hindostan. *Verh. Bat. Gen.*, xxv, p. 60 (1853).

[2] Jerdon, T. C.—On the Fresh Water Fishes of Southern India. *Madras Journ. Lit. Sci.*, xv, p. 313 (1848).

[3] Günther, A.—*Catalogue of the Fishes in the British Museum*, vii, p. 130 (London: 1868).

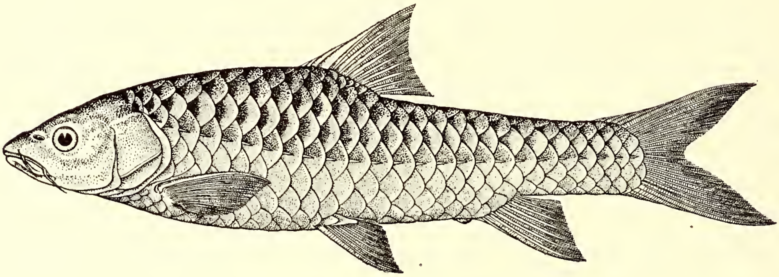
[4] Day, F.—*Fishes of India*, p. 569 (London: 1878).

[5] Hora, S. L. and Mukerji, D. D.—Fish of the Eastern Doons, United Provinces. *Rec. Ind. Mus.*, xxxviii, pp. 139-142 (1936).

[6] Hamilton, F.—*Fish Ganges*, pp. 303-307 (Edinburgh: 1822).

[7] Hora, S. L.—On a further collection of Fish from the Naga Hills. *Rec. Ind. Mus.*, xxxviii, pp. 324-331 (1936).

[8] McClelland, J.—Indian Cyprinidae. *As. Res.*, xix, pp. 332-340 (1839).

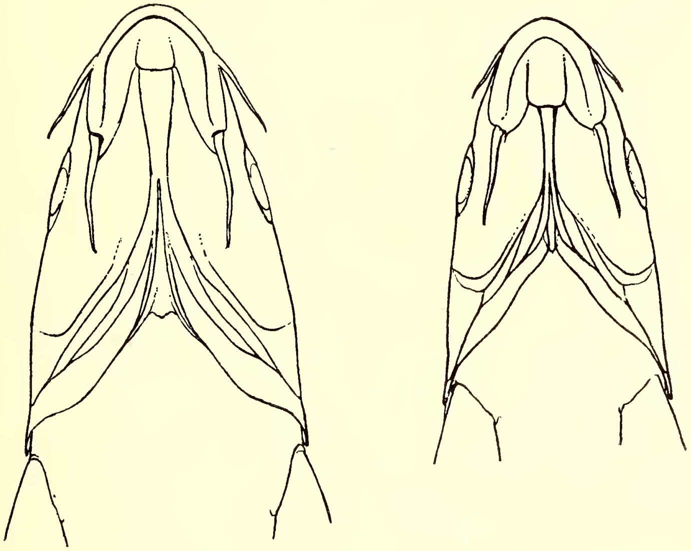


Text-fig. 1.—Lateral view of *Barbus khudree* Sykes. ×$\frac{2}{9}$.

The dorsal fin commences in advance of the ventrals and somewhat nearer to the tip of the snout than to the base of the caudal fin; its last spine is very strong and bony. The length of the dorsal spine is proportionately greater in smaller individuals; it is contained from 1.3 to 1.8 times in the length of the head. The dorsal fin is considerably shorter than the depth of the body below it. The pectoral fin is shorter than the head and is separated from the ventral by a considerable distance. The ventral fin is similar to the pectoral and is provided with a scaly appendage at its base. The anal opening is situated just in front of the anal fin. The caudal peduncle is about one and a half times as long as broad. The caudal fin is deeply forked with both the lobes pointed.

Usually there are 25 scales along the lateral line, but in some young specimens there are 26 or even 27. The number of predorsal scales is 10 and there are 2½ series of large scales between the lateral line and the base of the ventral fin.

The general colour of the spirit specimens is grayish above and silvery below. The scales along the dorsal half of the body are provided with diffuse black markings in their basal portions. In young specimens, up to 45 mm. in total length, there is usually a black spot at the base of the caudal fin.



Text-fig. 2.—Ventral surface of head in two specimens of *Barbus khudree* Sykes, showing variation in the extent of the median lobe of the lower lip. × 1⅕.

Remarks:—In general facies, in the form of the head and lips, and in the nature of the dorsal spine, *Barbus khudree* is similar to *B. putitora*; its body is, however, almost as deep as the length of the head whereas in *B. putitora* the head is considerably longer than the depth of the body. *B. khudree* also resembles *B. progeneius*, but the dorsal spine of the former is very strong and the median lobe of the lower lip is fairly distinct, even in young specimens. It may be noted that so far only a few specimens of *B. progeneius* have been collected and it seems probable that when more material becomes available Sykes' species may prove to be a mere local race of the Assamese *progeneius*.

B. khudree favours strong currents in rivers and in such situations it is fairly common in the headwaters of the Godavari River.

Measurements in millimetres

Total length excluding caudal	362·0	300·0	194·0	129·0	85·0	74·0	34·0
Length of caudal ...	93·0	Damaged	56·0	34·0	23·0	21·0	11·0
Length of head	94·0	81·0	53·0	34·0	23·0	21·0	11·0
Width of head	57·0	46·5	31·0	21·0	13·5	13·0	6·0
Height of head at occiput ...	64·0	52·5	37·0	23·0	16·0	16·0	8·0
Depth of body	97·0	76·5	51·0	36·0	24·0	21·0	10·0
Width of body	60·0	53·0	30·0	20·0	13·5	12·5	5·0
Diameter of eye	20·0	19·0	14·0	9·0	7·0	7·0	4·0
Length of snout	29·0	26·0	18·0	11·0	8·0	7·0	4·0
Interorbital distance ...	34·0	29·0	18·0	11·0	8·0	7·0	4·0
Length of rostral barbel ...	15·0	12·0	9·0	7·0	4·0	4·0	2·0
Length of maxillary barbel.	20·0	17·0	15·0	10·0	5·0	5·0	2·1
Length of dorsal fin ...	73·0	69·0	43·0	31·0	23·0	19·0	9·0
Length of dorsal spine ...	50·0	45·0	37·0	25·0	17·0	15·0	6·0
Length of pectoral ...	71·0	61·0	40·0	25·0	17·0	15·0	6·4
Length of ventral ...	63·0	50·0	34·0	22·0	15·0	13·0	6·0
Length of caudal peduncle ...	61·5	51·0	40·0	25·0	16·0	14·0	6·0
Least height of caudal peduncle	42·0	36·0	23·0	16·0	11·0	9·0	4·0

Barbus kolus Sykes.

(Plate I)

1841. *Barbus kolus*, Sykes, *Trans. Zool. Soc. London*, II, p. 357, pl. lxii, fig. 1.

1868. *Barbus kolus*, Günther, *Cat. Fish Brit. Mus.*, vii, p. 136.

1878. *Barbus kolus*, Day, *Fish. India*, p. 573, pl. cxli, fig. 2.

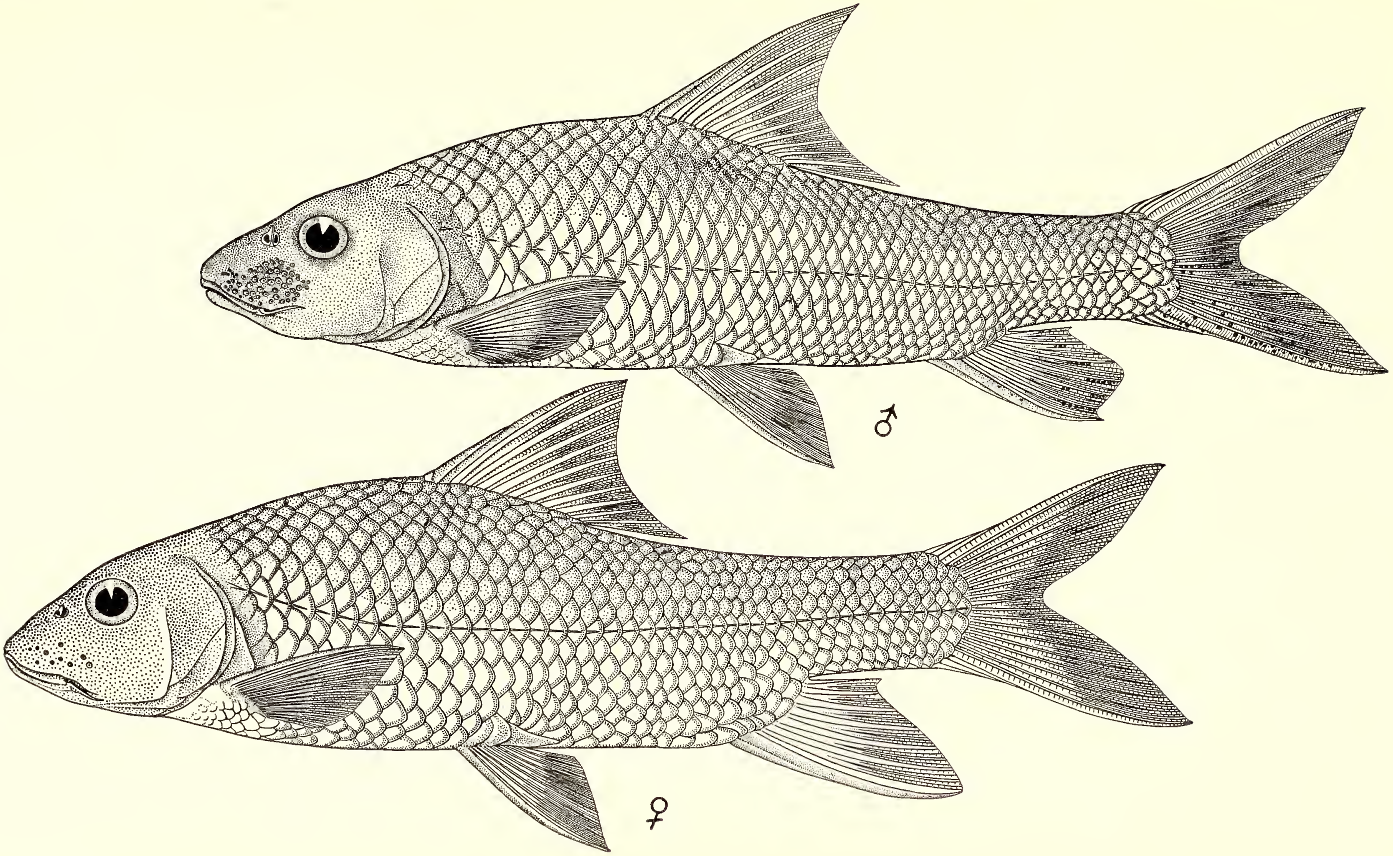
Barbus kolus is a fairly well known South Indian species. From an examination of a very large number of specimens of this species in Mr. Fraser's collection we found certain characters by which the sexes can be readily distinguished. In the adult males patches of well-developed horny tubercles ('pearl organs') are present on the sides of the snout, on certain rays of the anal fin and in the lower half of the caudal fin. In the case of females only a few small tubercles are sometimes present on the sides of the snout. In the males the body is proportionately less deep and the head longer and more pointed; the dorsal fin is more concave and the outer rays of the anal fin are short so that the median rays form a lobe in the middle of the fin. The secondary sexual differences noted above can be made out clearly from a comparison of the drawings of a male and a female specimens reproduced on plate I.

It may be noted that both Sykes and Günther made a reference to the tubercles on the head, but they were probably absent in Day's specimens, as he makes no mention of them in his descriptions.

Barbus ticto (Hamilton).

Among the large number of specimens of *Barbus ticto* collected by Mr. Fraser two colour forms could be readily distinguished. In one form the membranes between the rays of the dorsal and the anal fins were intensely black, while in the other these membranes totally lacked this colour. On opening a number of specimens of each

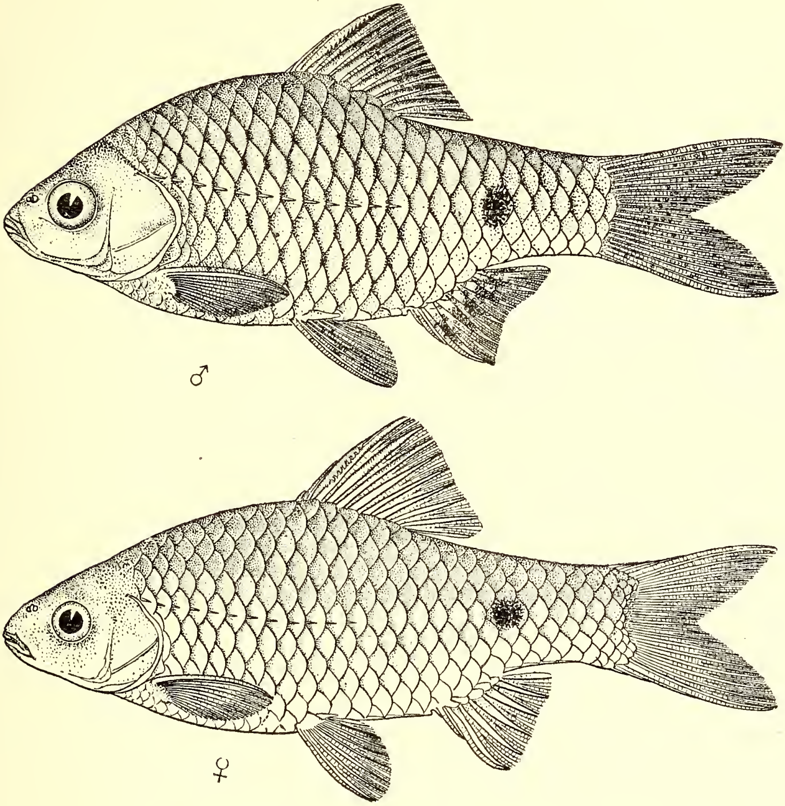
PLATE I



B. Bagchi, *del.*

Barbus kolus Sykes.

kind it was observed that the coloured specimens were males and the plain specimens were females. In the males a number of horny tubercles were present on the caudal fin, while a few of these 'pearl organs' were also present on other fins. Both the colouration and the horny tubercles thus seem to be the secondary sexual characters of the male.



Text-fig. 3.—Lateral view of a male and a female specimen of *Barbus ticto* (Ham.), showing the nature of the secondary sexual characters. × 1 $\frac{3}{5}$

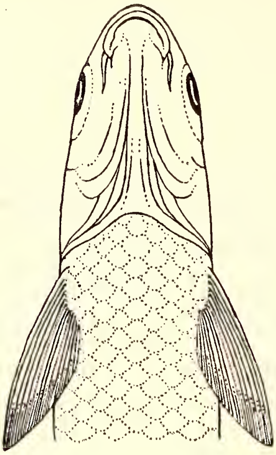
In the Deolali examples the lateral line extends over 10 to 12 scales.

Barbus fraseri sp. nov.

(Plate III, fig. 2).

D. 2/8; A. 3/5; P. 12; V. 8; C. 19; L.l. 42-45.

The new Carp-minnow, which we have great pleasure in associating with the name of Mr. A. G. L. Fraser, is of the *Puntius* type. Its dorsal and ventral profiles are slightly arched and the body is gracefully stream-lined. The head is small and broadly pointed; its length is contained about 5.4 times in the total length and 4 times in the length without the caudal. The width of the head is contained 1.7 times and its height 1.5 times in its length. The eyes are large and lateral; they are situated much nearer the tip of the snout than the posterior margin of the head; the diameter of the eye is contained 3 times in the length of the head, 0.8 times in the length of the snout and 1.2 times in the interorbital distance. The mouth is small, lunate and subanterior; it is bordered by fleshy lips which are continuous at the angles of the mouth. The labial groove is widely interrupted in the middle. There are two short maxillary barbels which are less than half the diameter of the eye. Sensory pores are arranged in loops above and below the eyes; they meet posteriorly and are continued into the lateral line which extends over 8 to 10 scales.

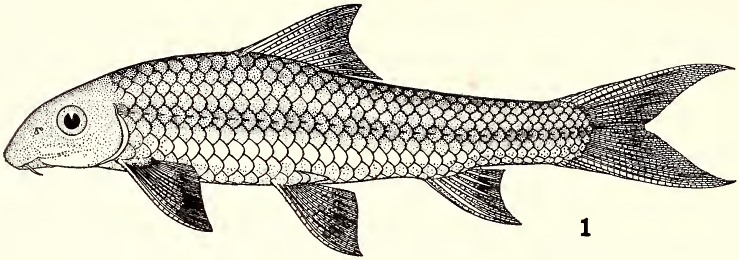


Text-fig. 4.—Ventral surface of head and anterior part of body of *Barbus fraseri* sp. nov. ×4.

The depth of the body is considerably greater than the length of the head; it is contained from 4.3 to 4.4 times in the total length and about 3.2 times in the length without the caudal. The caudal peduncle is narrow; its least height being contained about 1.7 times in its length. The body is covered with small, more or less deciduous scales; there are 42 to 45 scales along the lateral line, 17 series of scales between the bases of the dorsal and ventral fins, 16 round the caudal peduncle and 15 to 16 before the base of the dorsal fin. There is a small scaly appendage at the base of the ventral fin. The anal opening is situated on a prominence close to the commencement of the anal fin.

The dorsal fin commences midway between the tip of the snout and the base of the caudal fin, and almost opposite the commencement of the ventrals; it is almost as long as the head and considerably shorter than the depth of the body below it. The posterior free border of the fin is slightly concave and its last undivided ray is osseous and serrated. The pectoral fin is shorter than the head and is separated from the ventral by a considerable distance; it is about four-fifths of the length of the head. The ventral fin is similar to the pectoral and extends to the commencement of the anal fin. The caudal fin is considerably longer than the head and is deeply forked; both the lobes are sharply pointed.

The colour of the spirit specimens is pale-olivaceous; it is somewhat darker along the dorsal surface. Along the middle of the body there is a silvery streak which becomes wider posteriorly. There is a rounded black spot at the sides of the tail slightly in front of the base of the caudal fin. A somewhat smaller black spot is also present at the base of the anterior rays of the dorsal fin.



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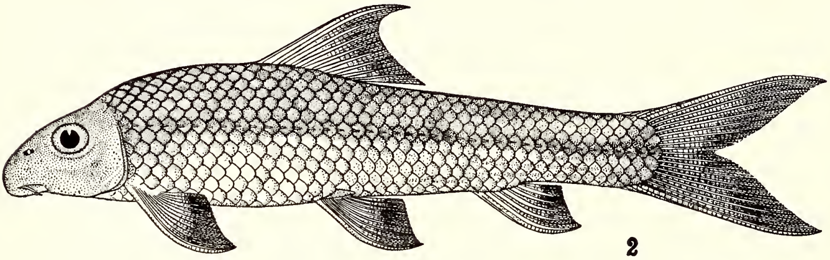

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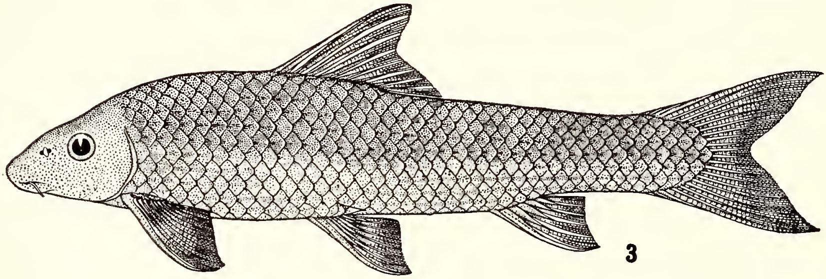

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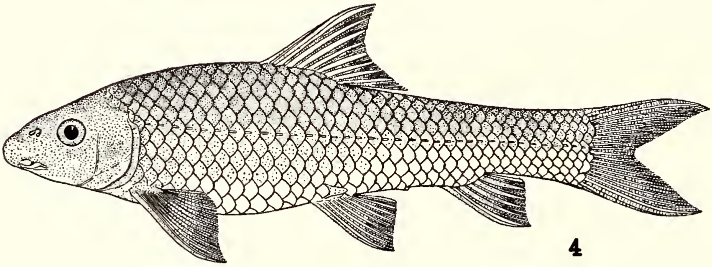

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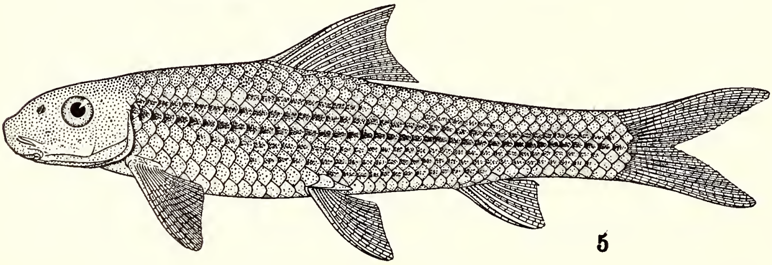


5

B. Bagchi, *del.*

Crossochilus latius (Hamilton) and the allied forms.

Locality :—Darna river, Deolali. Only seven specimens of *Barbus fraseri* were collected at three different points on the river.

Type-specimen :—F 12497/1, *Zoological Survey of India, Indian Museum, Calcutta.*

Remarks :—*Barbus fraseri* can be distinguished readily by the following combination of characters:—

(i) Presence of only two barbels.
(ii) Presence of an osseous, serrated spine.
(iii) Incomplete lateral line.
(iv) Small scales, about 42-45 along the lateral line.
(v) Colouration.

Judged by the above noted characters, our new species seems closely allied to the members of the Malayan genus *Hampala* Bleeker, but differs from it in the extent of the mouth opening, small scales and incomplete lateral line. We are not aware of any other species of the *Puntius*-type which bears any resemblance to the form described above.

Measurements in millimetres.

Total length excluding caudal	34·0	34·0	33·0
Length of caudal	Damaged	12·0	12·0
Length of head	8·5	8·5	8·4
Width of head	5·0	5·0	5·0
Height of head at occiput	7·0	7·0	7·0
Length of snout	2·2	2·5	2·2
Diameter of eye	2·7	2·8	2·7
Interorbital width	3·3	3·4	3·3
Depth of body	10·5	10·4	10·5
Width of body	5·2	5·1	5·1
Length of caudal peduncle	7·5	7·5	7·6
Least height of caudal peduncle	4·5	4·5	4·5
Longest ray of dorsal	8·5	8·5	8·5
Longest ray of anal	4·5	5·0	5·0
Length of pectoral	6·0	6·1	6·1
Length of ventral	7·5	7·6	7·5

Crossochilus latius (Hamilton).

(Plate III)

1934. *Crossochilus latius* (*forma typica*), Mukerji, *Journ. Bom. Nat. Hist. Soc.*, xxxvii, p. 50.

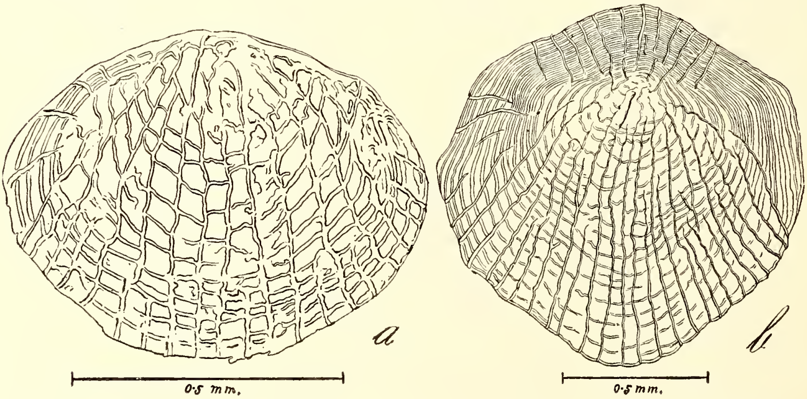
In his detailed work on *Crossochilus latius,* Mukerji observed three distinct types—the typical form from the Brahmaputra river system, the Assamese and Burmese form and the Punjab form. Later work on these fishes from the Eastern Doons, Naga Hills and Kashmir has fully confirmed Mukerji's conclusions. The Punjab and the Burmese forms are now regarded as distinct species—*C. punjabensis* Mukerji and *C. burmanicus* Hora respectively; while the typical form was observed to be limited to the Ganges and the Brahmaputra systems in Northern India. The specimens collected by Mr. Fraser in the Deolali waters are of a considerably smaller size than those found in North India, but morphologically they seem to represent the typical *C. latius*. In the Deccan specimens, however, the eyes are relatively smaller, and in this respect they agree with the Burmese examples. The different species into which *Crossochilus latius* is now divided are figured on plate III.

Parapsilorhynchus prateri sp. nov.

(Plate II, figs. 1, 1*a*, 1*b*).

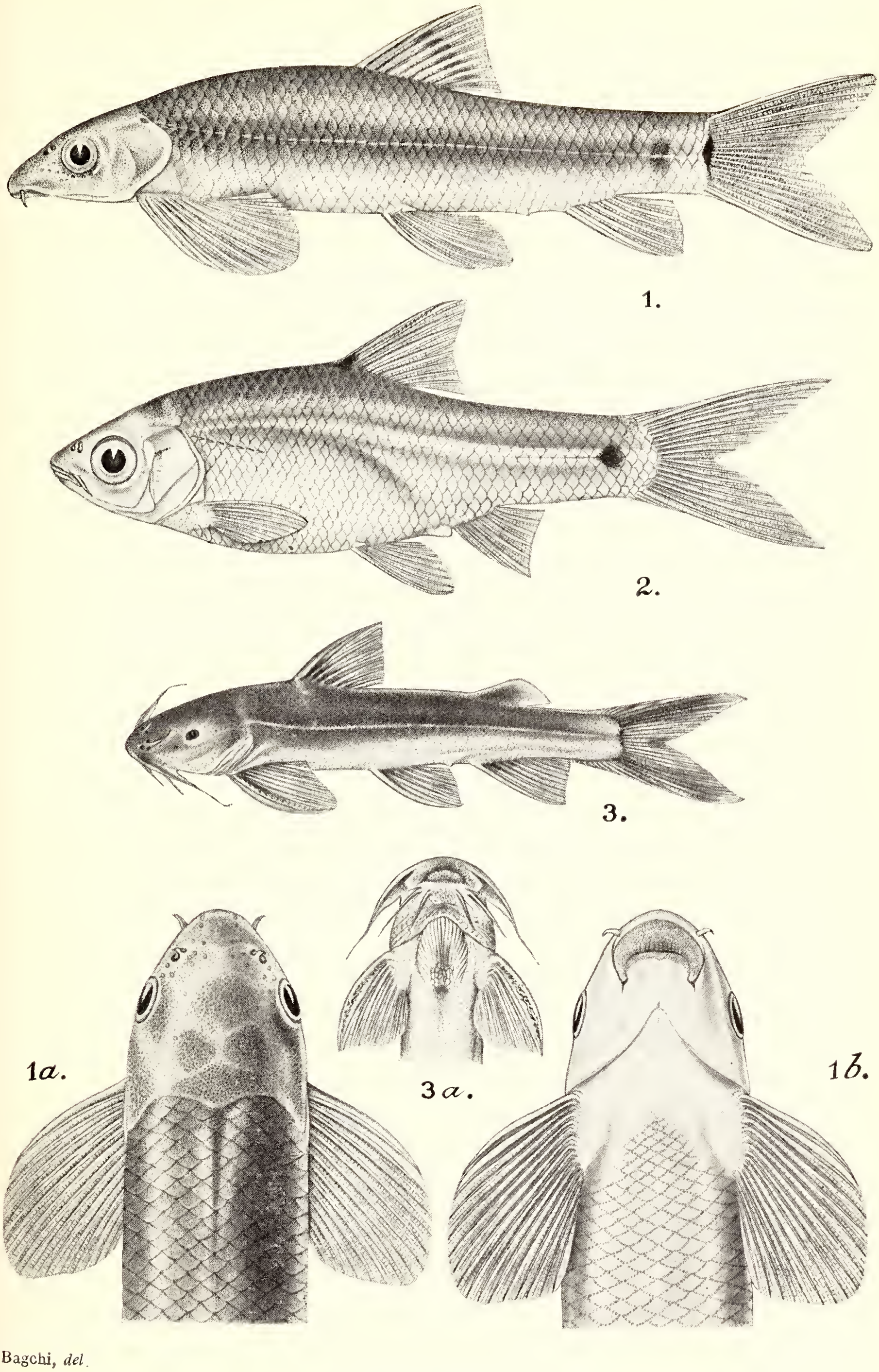
D. 2/8; A. 2/5; P. 15; V. 9; C. 19; L.l. 43-47.

In *Parapsilorhynchus prateri,* a small *Garra*-like fish which we have great pleasure in associating with the name of Mr. S. H. Prater, the head and body are considerably depressed and the ventral surface flattened; the dorsal surface is gently arched while the ventral surface is horizontal. The head is broadly pointed anteriorly; it is proportionately longer in young individuals, its length being contained from 4.4 to 5.3 times in the total length and from 3.5 to 4.2 times in the length without the caudal. The width of the head is contained about 1.3 times and its height at occiput 1.6 times in its length. The eyes are fairly prominent and lateral in position; they are visible both from above and below, and are situated almost in the middle of the length of the head. The diameter of the eye is contained from 3.5 to 5 times in the length of the head, from 1.3 to 1.9 times in the length of the snout and from 1.6 to 2.5 times in the interorbital width; the eye is proportionately larger in young individuals. The mouth is small, inferior and horizontal. The upper lip is covered by a prominent rostral fold which is fringed and covered with minute tubercles. The lower



Text-fig. 5.—Scales from below base of dorsal fin of *Parapsilorhynchus* Hora.
a. *Parapsilorhynchus prateri* sp. nov.;
b. *Parapsilorhynchus tentaculatus* (Annandale).

PLATE III



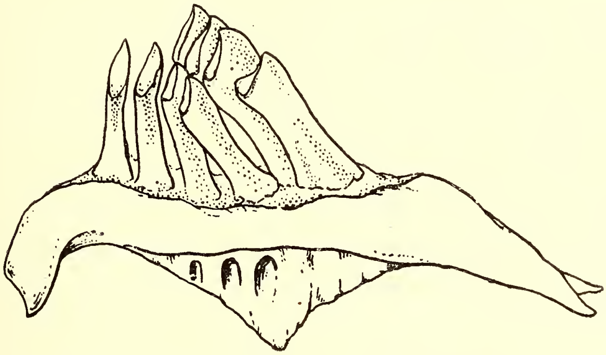
B. Bagchi, *del.*

Fish of Deolali.

lip is also finely papillated. There is a groove round the corners of the mouth which is continued anteriorly round the outer margin of the rostral fold. There are two short and stumpy rostral barbels. The head is provided with a series of sensory pores. Behind the lower lip, which is slightly emarginate, there is a callous area of the skin which presumably helps the fish in adhering to rocks and stones in fast currents and is thus homologous with the post labial disc of *Garra*.

The body is almost as broad as deep; its height is contained from 6.9 to 7.6 times in the total length and from 5.3 to 6.0 times in the length without the caudal. The caudal peduncle is almost as long as or slightly longer than its least height. The scales are small and firmly adherent; there are from 43 to 47 scales along the lateral line, 4½ between the lateral line and the base of the ventral fin, 16 round the caudal peduncle and 21-22 in front of the dorsal fin. The scales are totally absent on the ventral surface between the bases of the pectoral fins and only faintly marked in the area up to the ventral fins.

The scales of *P. prateri* are of a remarkable type; their sculpture consists of a network of radii, all originating from the base and directed distally, and circuli, which enclose small rhomboidal areas. In the allied species *P. tentaculatus* (Annandale) there is a well-defined nucleus from which radii are given both towards the base and to the outer margin. The circuli are not so well developed.



Text-fig. 6.—Pharyngeal bone and teeth of *Parapsilorhynchus prateri*, sp. nov. ×30.

The alimentary canal is greatly convoluted showing that the fish feeds mainly on algal matter which it scrapes off the rocks with the help of its sharp-edged lower jaw. The pharyngeal teeth are sickle-shaped and are distributed in two rows (4.4/4.4). The air-bladder is of the normal Cyprinoid type, but is small and cylindrical. The eggs are of a large size, about 2 mm. in diameter in a fish about 50 mm. in total length.

The dorsal fin commences in advance of the ventrals and is almost midway between the tip of the snout and the base of the caudal fin; sometimes it is slightly nearer to the latter than to the former; its longest ray is almost equal to the depth of the body below it. The paired fins are horizontally placed and fan-shaped; the pectoral fins are almost as long as the head and are separated from the ventrals by a considerable distance. The outer rays of the pectoral fins are provided with adhesive pads on their ventral surface. The ventrals are similar to the pectorals and just extend to the anal opening, which is situated at a distance of one diameter of the eye from the commencement of the anal fin. The ànal fin is similar to the dorsal. The caudal fin is deeply forked.

In spirit specimens the colouration is grayish above and pale-olivaceous on the lower half. Along the lateral line there is a broad longitudinal band of a somewhat deeper colour with a lighter band above it. There is a black mark near the upper angle of the gill opening which is partly covered by the gill membrane. A short, narrow, vertical bar is present at base of the caudal fin and another, somewhat broader and more diffuse, in front of it. There is a series of black markings about the middle of the dorsal fin. In some specimens the body is covered with small black spots.

Locality:—Several specimens of *P. prateri* were collected by Mr. Fraser in the North Nallah and Narsullah Wadi.

Type-specimen:—F 12498/1, *Zoological Survey of India, Indian Museum, Calcutta.*

Remarks:—The genus *Parapsilorhynchus* was proposed[1] to accommodate a species discovered by Annandale[2] from small streams in the Poona District and though I described another species in this genus at the same time, the two were afterwards[3] found to be synonymous. *P. prateri* differs from *P. tentaculatus* in having smaller scales and in proportions. There are differences in the scale-sculpture also (text-fig. 5).

In establishing *Parapsilorhynchus* as a distinct genus attention was directed to the features by which it can be distinguished from *Psilorhynchus* McClelland. The features common to both genera are the structures associated with the mouth, such as the rostral fold, grooves round the corners of the mouth, small mouth, sharp lower jaw, etc. A close study of these genera indicates that *Parapsilorhynchus* is less specialised and perhaps an ancestral form. To these two genera must also be added *Gyrinocheilus* Vaillant of Indo-China, Siam and the Malay Archipelago, in which the mouth structures are of the same type.

The occurrence of *Parapsilorhynchus* at Pachmarhi in the Satpura Hills (Hora, *op. cit.*, 1925) shows that the Satpura Mountains may have served at one time as a highway for the migration of the East

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[1] Hora, S. L.—On a New Genus of Fish closely resembling *Psilorhynchus*, McClelland. *Rec. Ind. Mus.*, xxii, pp. 13-17 (1921).

[2] Annandale, N.—The Fauna of certain small streams in the Bombay Presidency. *Rec. Ind. Mus.*, xvi, p. 128 (1919).

[3] Hora, S. L.—On the Fishes of the genus *Parapsilorhynchus* Hora. *Rec. Ind. Mus.* xxvii, p. 457 (1925).

Himalayan forms to the Western Ghats and thence to the hills of the Peninsula.[1]

Measurements in millimetres.

Total length including caudal	59·0	50·0	49·0	49·0
Length of caudal	12·0	11·0	11·0	11·0
Length of head	11·0	10·0	10·0	10·0
Width of head	8·0	7·3	7·2	7·2
Height of head at occiput	6·3	6·0	6·0	6·0
Length of snout	4·0	3·8	3·8	3·8
Diameter of eye	2·5	2·0	2·0	2·0
Interorbital width	5·2	5.0	5·0	5·0
Height of body	8·0	7·0	7·1	7·1
Width of body	7·9	6·9	6·9	6·9
Length of caudal peduncle	6·1	5·0	5·0	5·0
Least height of caudal peduncle	5·3	4·8	4·5	5·0
Longest ray of dorsal	9·0	7·5	7·3	7·3
Longest ray of anal	8·5	5·9	6·0	5·9
Length of pectoral	11·0	9·8	9·6	9·9
Length of ventral	9·2	7·5	7·5	7·5

Lepidocephalichthys guntea (Ham.).

1878. *Lepidocephalichthys guntea,* Day, *Fish. India,* p. 609, pl. clv, fig. 4.

In the case of the Deccan specimens of *Lepidocephalichthys guntea*, Day noted that they possessed only about four rows of spots on the caudal fin and often two rows on the anal fin. In the specimens from the Deolali waters the colour is very variable and there are usually several rows of spots on the caudal fin.

Some of the specimens were greatly compressed and attenuated, and superficially seemed to represent a different species. A careful examination of the material showed that with the exception of better marked scales in the thin individual no other differences could be made out. From Mr. Fraser's labels we found that the thin specimens were those that had lived in an aquarium for a long time. Presumably for want of sufficient food under unnatural conditions they had become attenuated. The scales on the body had become prominent owing to the reduction in the surface area of the body.

Nemachilus botius (Ham.).

1878. *Nemachilus botia,* Day, *Fish. India,* p. 614, pl. clvi, fig. 5.

Day's accounts and figures of *Nemachilus botius, N. aureus,* and *N. sinuatus* show a very close relationship between these species; they are alike in their general facies but differ in the number of rays in the dorsal fin and the relative extent of the lateral line.

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[1] Hora, S. L.—Distribution of Himalayan Fishes and its bearing on certain Palæogeographical problems. *Rec. Ind. Mus.*, xxxix, pp. 255-256 (1937).

Mukerji[1] gave a review of *N. botius* and directed attention to its great variability. We have also noted considerable variation in the number of rays in the dorsal fin and in the extent of the lateral line in the specimens from Deolali, but till good series of specimens become available from different parts of India, Burma and Ceylon it is difficult to discuss its races and varieties.

Nemachilus denisonii Day.

1878. *Nemachilus Denisonii*, Day, *Fish. India*, p. 617, pl. cliii, fig. 5.

The specimens of *Nemachilus denisonii* collected by Mr. Fraser from the Deolali waters are more slender than the examples from the Nilgiris. The colouration of this species is very variable and in the Deolali specimens the caudal fin, instead of being bilobate, is distinctly and deeply forked.

As already noted by Day, we are also of the opinion that *N. notostigma* Bleeker of Ceylon is probably a synonym of *N. denisonii*.

Glyptothorax annandalei Hora.

(Plate III, figs. 3, 3*a*).

1923. *Glyptothorax annandalei*, Hora, *Rec. Ind. Mus.*, xxv, p. 14, pl. i, fig. 3.

In Mr. Fraser's collection there is a single specimen about 65 mm. in total length which we refer to *Glyptothorax annandalei*. It was obtained from the Godavari river and was listed as *G. lonah* in parts I and II of the present series of articles. Recently we obtained some material from the Moola Mutha river near Poona, the type-locality of most of Sykes' species, and doubts arose as to the precise specific limits of *G. lonah*. A more careful examination of the Godavari example and its comparison with the type-series of *G. annandalei* showed that it is presumably a juvenile form of the latter. It possesses an adhesive apparatus on the ventral surface of the pectoral spines, tuberculated body and a series of larger tubercles along the lateral line. The illustrations of the specimen on plate II show some of its salient features.

Glyptothorax annandalei was described from the Bhavani river at the base of the Nilgiris. If our identification of the Godavari example proves to be correct, the species will probably be found to occur all along the Western Ghats.

Ambassis baculis (Hamilton).

1876. *Ambassis baculis*, Day, *Fish. India*, p. 51, pl. xv, fig. 1.

Day gave the distribution of *Ambassis baculis* as: 'Fresh waters of Orissa, Bengal, and as far north as the Punjab : also in Burma.'

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[1] Mukerji, D. D.—Fishes of the Mali Hka River. *Journ. Bom. Nat. Hist. Soc.*, xxxvii, pp. 39-43 (1934).

The record of the species from Deolali is, therefore, of some interest. Though in its deeper body *A. baculis* agrees with *A. nama,* in a great many morphological features it is more closely allied to *A. ranga*. *A. baculis* can be readily distinguished by its smaller scales (about 80 along the lateral line), smaller eyes and the presence of a shoulder spot.

CONCLUDING REMARKS.

In the introduction to the first part of this series one of us undertook to discuss the geographical relationships of the fish fauna of Deolali, with special reference to its affinities with that of the Deccan, but such a course will not be possible now as large collections of freshwater fish have since been received from several localities in the Deccan, and until these are worked out it will not be possible to assess fully the geographical distribution of various species. Particular mention may be made of another collection made by Mr. A. G. L. Fraser at Poona which should enable us to clear the taxonomy of some of the little-known species of Sykes, who in 1841 described a large variety of fishes from Poona and the adjoining areas.

EXPLANATION OF PLATES.

Plate I.

Barbus kolus Sykes.

A mature male and a female specimen of *Barbus kolus* Sykes, showing secondary sexual differences.

Male. × 5/12; Female. × ½

Plate II.

Crossochilus latius (Hamilton) and the allied forms.

Fig. 1.—*Crossochilus burmanicus* Hora from Lower Burma. × ½.

Fig. 2.—*Crossochilus latius* (Ham.) from Manipur, Assam. × ¾.

Fig. 3.—*Crossochilus latius* (Ham.) from Dehra Dun, U.P. × ½.

Fig. 4.—*Crossochilus punjabensis* Mukerji from Srinagar, Kashmir. × ¾.

Fig. 5.—*Crossochilus latius* (Ham.) from Deolali. × ¾.

Plate III.

Fish of Deolali.

Fig. 1.—Lateral view of the type-specimen of *Parapsilorhynchus prateri*, sp. nov. × 2⅖.

Fig. 1*a*.—Dorsal surface of head and anterior part of body of same. × 3⅕.

Fig. 1*b*.—Ventral surface of head and anterior part of body of same. × 3⅕.

Fig. 2.—Lateral view of the type-specimen of *Barbus fraseri*, sp. nov. × 2 $\frac{2}{5}$.

Fig. 3.—Lateral view of a young specimens of *Glyptothorax annandalei* Hora. × 1 $\frac{1}{5}$.

Fig. 3*a*.—Ventral surface of head and anterial part of body of same. × 1 $\frac{1}{5}$.